



A Survey on Block Chain Based Decentralised Twitter DApp Using MetaMask

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ABSTRACT

This paper presents a blockchain-based decentralized Twitter DApp that uses MetaMask, a browser extension, to securely connect to the Ethereum public blockchain network. The decentralized Twitter DApp offers a decentralized and censorship-resistant alternative to centralized social media platforms like Twitter, leveraging the benefits of public blockchain, distributed ledger technology, and a decentralized system. The platform allows users to interact with each other directly without the need for a central authority, and the data is stored on a distributed ledger technology that is maintained by a network of nodes. This makes it virtually impossible for any single entity to control the data, ensuring transparency and security. The use of cryptocurrency tokens incentivizes users to contribute to the platform, earning tokens for creating and sharing content, and using tokens to access premium features or support other users. This encourages a more democratic and user-controlled social media experience that is less prone to censorship and manipulation by third parties. Overall, the blockchain-based decentralized Twitter DApp, accessed through MetaMask, offers a secure and user-friendly way for users to participate in a decentralized system that is more transparent, democratic, and resistant to censorship and manipulation. The key words of this paper, including public blockchain, distributed ledger technology, and decentralized system, highlight the importance of these technologies in creating a more open and inclusive online community.

Key terms: Public block chain, Distributed ledger Technology, Decentralized system.

1. Introduction

A blockchain-based decentralized Twitter DApp is a social media platform built on blockchain technology that provides a decentralized and censorship-resistant alternative to centralized social media platforms like Twitter. MetaMask is a browser extension that enables users to interact with such DApps by securely connecting to the Ethereum blockchain network.

By using MetaMask, users can manage their digital assets securely and easily, including the cryptocurrency tokens used to incentivize participation in the blockchain-based Twitter DApp. With the decentralized nature of the platform, users can interact with each other directly, and they have greater control over their data and how it is shared.

The use of cryptocurrency tokens incentivizes users to create and share content, and they can use tokens to access premium features or support other users. Overall, a blockchain-based decentralized Twitter DApp accessed through MetaMask offers a secure and user-friendly way for users to participate in a more democratic and user-controlled social media platform that is less prone to censorship and manipulation by third parties

2. Literature Review

A blockchain is a developing distributed ledger that maintains a permanent record of all transactions in a safe, orderly, and unchangeable manner as discussed in the following sections.

2.1 Alchemy

The cofounder and CEO of Alchemy, the top blockchain developer platform in the world, is Nikil Viswanathan and **Joe Lau**. In this paper, A blockchain scaling platform called Alchemy enables developers to safely design, test, and keep track of their decentralised apps (DApps). The platform offers dependable node management endpoints and network connectivity. The Alchemy team has years of experience in top positions at major giants like Google, Microsoft, Facebook, Stanford, and MIT, as well as extensive expertise in massively scalable infrastructure, artificial intelligence, and blockchain. Alchemy powers billions of dollars' worth of transactions for top businesses throughout the world, with support from Stanford University, Coinbase, the

Chairman of Google, Charles Schwab, and founders and executives of globally renowned firms. The greatest way to ensure that web3 is accessible to all, according to Lau, is to support the incredibly inventive developers who are using blockchain technology to realise their ideas.

2.2 Smart Contract

Nick Szabo, who created the phrase, first advocated smart contracts in the early 1990s, defining them as "a set of promises, stated in digital form, including protocols within which the parties fulfil on these promises." The phrase was first used to describe items in the rights management service layer of the Stanford Infobus, a component of the Stanford Digital Library Project, in 1998. Although a smart legal contract is meant to be both machine-executable and legally enforceable, it often does not represent a legally binding agreement. A "smart contract" is, in the words of the US National Institute of Standards and Technology, "a collection of code and data (also known as functions and state) that is implemented using cryptographically signed transactions on the blockchain network." The phrase "smart contract" has been more specifically used to refer to the idea of general purpose computation that takes place on a blockchain or distributed ledger since the 2015 introduction of the Ethereum blockchain. By putting into effect the Decree on Development of Digital Economy, Belarus became the first nation to ever [doubt - discuss] legalise smart contracts in 2017.

2.3 Open Zeppelin(ERC-721 NON-FUNGIBLE TOKEN STANDARD)

A non-convertible token regulation called ERC-721 (Ethereum Request for Comments 721) mandates an API for tokens used in smart contracts. Nastassia Sachs, William Entriken, Dieter Shirley, Jacob Evans, and others made the suggestion in January 2018. It offers features like the ability to transfer tokens between accounts, control an account's ongoing token balance, identify the owner of a specific token, and figure out how many tokens are currently in circulation on the network. The ability to authorize the transfer of a specific number of tokens from one account to another is one of the additional features it offers in addition to these. The methods are implemented in an ERC-721 Non-Convertible Token Contract. After deployment, the contract is in charge of removing the Ethereum-produced tokens.

2.4 IPFS

Inventor of IPFS was Juan Benet, who in May 2014 launched Protocol Labs. By October of the same year, IPFS was "fast spreading through word of mouth," according to TechCrunch, which had first reported on it in February 2015 in an early form. InterPlanetary File System (IPFS) is a peer-to-peer, version-controlled, fixed-addressed file system. It uses concepts from computer science like the dispersed hash table, bitswap (inspired by bittorrent), and merkledag (inspired by the git protocol). Using IPFS, users can host, administer, and share any kind of file on the blockchain of their choice. As an IPFS pinning service, we focus on giving authors of all skill levels a quick, dependable, and easy way to share their work without limitations. A protocol, hypermedia system, and peer-to-peer file-sharing network called the InterPlanetary File System is used to store and share data in a dispersed file system. Each file in a global namespace connecting IPFS hosts is uniquely identified by content-addressing, which is used by IPFS.

2.5 Hardhat

The Nomic Foundation was behind Hardhat creation. Developers may test, compile, deploy, and debug DApps built on the Ethereum network using the Hardhat environment. A local Ethereum network that has already been implemented within Hardhat was created with development in mind. This network focal point is on the Solidity debugging and offers stack hint, failure communication for DApp transactions, etc. This gives the developers the vital resources they need to comprehend the root. Hardhat smart contract development environment sourced suitable tools to developers for carry off the development workflow.

2.6 Context API

It is developed by Eylon Ronen. A React app can create global variables that can be passed around by using the React Context API. This is an alternative to "prop drilling," which entails passing along props from grandparents to grandchildren to parents and so forth. Context is also promoted as a simpler, lighter method of Redux state management. Context API is a (kind of) new feature that React 16.3 implemented that makes it simple and easy to exchange state throughout the entire project (or a portion of it).

2.7 Rinkeby Network

The Geth team founded the proof-of-authority blockchain known as CRinkeby. Ether must be requested rather than mined. Before they are made available on the Ethereum mainnet, Dapps built on Ethereum are tested on the Rinkeby testnet. The Goerli testnet, another well-liked testnet that makes use of the proof of authority consensus mechanism, will replace the Rinkeby testnet, which the Ethereum team created in 2017 using a modified proof of authority consensus model. Proof of authority (PoA), a kind of Proof of Stake, is a technique used by Rinkeby (PoS). On the network at this time, there are approximately 11,000,000 blocks, and as of 2021, Rinkeby had about 50 million transactions.

2.8 Web3.0

A "decentralized online ecosystem based on blockchain" is what Gavin Wood, the creator of Polkadot and a co-founder of Ethereum, first referred to as "Web3" in 2014. In 2021, Web3's concept gained more popularity. Blockchain technology will enable direct communication between users in the next phase of the internet. Users will communicate by becoming a part of a Decentralized Autonomous Organization (DAO), an organization that is run and owned by its members. Data about the user will be protected by a network of openly available smart contracts. These contracts will be stored on a blockchain, a decentralized network that nodes will control. Programmer Tim Berners-Lee, who created the World Wide Web (WWW), first referred to Web 3.0 as the Semantic Web. Berners-Lee envisioned a conceptually and contextually aware, autonomous, and open Internet that used AI and machine learning to serve as a "global brain" and interpret content. In Web 3.0, applications will be made smarter and more adaptive by combining machine learning and artificial intelligence (AI). Another aspect of the evolving Web 3.0 definition is the notion of a semantic web. The next version of the web is known as Web 3.0. Web 3.0 is still evolving and being constructed quickly. Decentralization is the cornerstone of Web 3.0, which could be seen as a rethink of Web 2.0. Users may be able to take back control of their data from centralized corporations that currently control the majority of the web that we use and interact with with the help of Web 3.0. In contrast to the current situation, Web 3.0 enables users to access the internet without jeopardizing their privacy. The third iteration of the internet, known as Web 3.0, is based on crypto-economic networks like Bitcoin and Ethereum. Crypto networks are community-controlled, decentralized networks with capabilities that will one day surpass even the most sophisticated centralized services. They combine the best elements of the first two internet eras. This represents the "executable" phase of the World Wide Web with dynamical applications, mutual services, and "machine-to-machine" fundamental interaction.

2.9 Vercel

Vercel is the frontend development platform that gives conceive the swiftness and dependability they need to introduce at the moment of product. After your Project has been successfully built, you can perform a Vercel Deployment. The build produces files that are consistent with the Build Output API, a file-system-based standard for a directory structure that makes use of all Vercel platform features, including Serverless Functions, Edge Functions, routing, and caching. Guillermo Rauch founded Vercel in 2015 under the name Zeit. In April 2020, Zeit changed their name to Vercel while keeping its triangle logo. Git repositories, with support for GitHub, GitLab, and Bitbucket repositories, are used by Vercel to manage deployments. Despite the fact that Vercel supports custom domains for deployments, every deployment receives a subdomain under the vercel.app domain by default. Cloudflare and Amazon Web Services are both used in Vercel's infrastructure.

3. Methodology

3.1.1 Existing System

The entire user database contains all of the data about the users. This means that all of the data may be used at the parent company's discretion. In a standard social media platform, the user interacts with the system through the user interface, which is often presented to them through an application or website. Most of the time, a web-API sits between the user system and the server, resulting in a three-tier arrangement. The server stores user data in data centres all around the country in a standard design. The company is free to use this data to develop customised services because it is their property.

3.1.2 Demerits of Existing System

The existing system's main flaws are as follows:

- The company that owns the social media is directly responsible for maintaining the data that users provide to the company.
- The organization disregards the privacy of the user and keeps track of every action the user takes within the application.
- Social media platforms that are controlled centrally are not a good way to meet new people. While Facebook and Instagram may be the best at bringing people together, doing so comes with a price: the company collects vast amounts of participant data and then sells targeted advertising using that information.

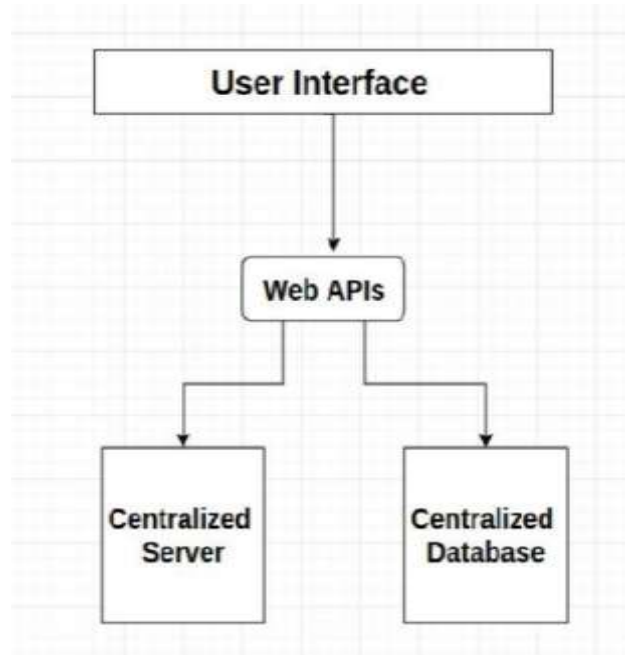


Figure 1: Architecture of existing systems

3.2 Proposed System

A decentralized Social Dapp is a programme that allows users to create Twitter accounts, add and remove tweets, and transmit messages from one account to another. We use networks like Ropsten and Rinkeby with ethers for conducting all transactions because block chain is a decentralised technology and ethers are used in all transactions. We deployed the contracts in this article using the Ethereum IDE, IPFS, Hardhat, Alchemy, Sanity IO and Metamask. A blockchain-based academic social networking website and a decentralised social network based on Ethereum and IPFS a protocol for using a blockchain algorithm for authentication. The Ethereum Blockchain and its smart contract capability serve as the foundation for the proposed system.

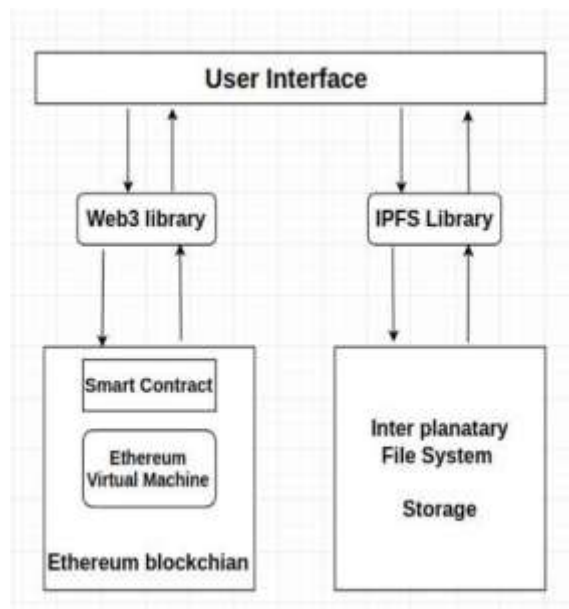


Figure 2 : Architecture of our proposed system

3.3 Algorithm

1. User downloads and installs the MetaMask browser extension.
2. User creates a new Ethereum wallet within MetaMask.
3. User logs into the decentralized Twitter DApp using their MetaMask wallet.

4. DApp verifies the user's MetaMask wallet address to ensure that the user has a valid Ethereum wallet.
5. User can view their Twitter feed and interact with other users on the platform.
6. User can create new tweets, which are then stored on the Ethereum public blockchain network.
7. User can earn cryptocurrency tokens for creating and sharing content on the platform, which are stored in their MetaMask wallet.
8. User can use cryptocurrency tokens to access premium features or support other users on the platform.
9. DApp uses distributed ledger technology to maintain a transparent and secure record of all user activity on the platform.
10. DApp ensures that the platform is decentralized, ensuring that no single entity has control over the data or user interactions on the platform.

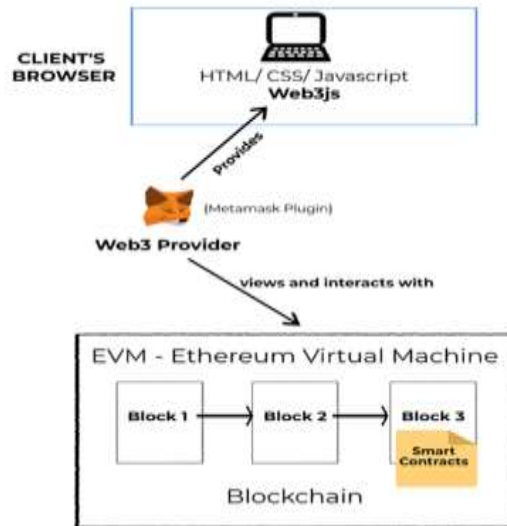


Figure 4: Algorithm

3.4 System Architecture

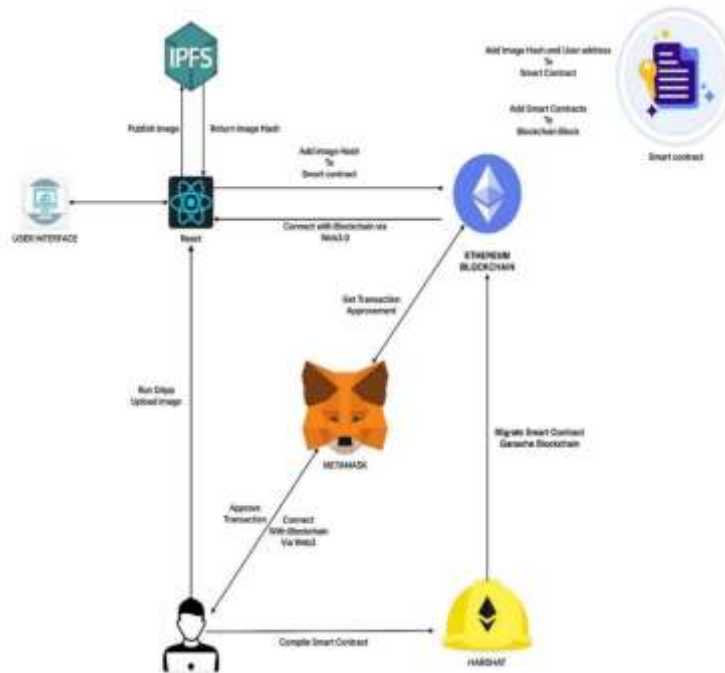


Figure 4: System Architecture

4. Results

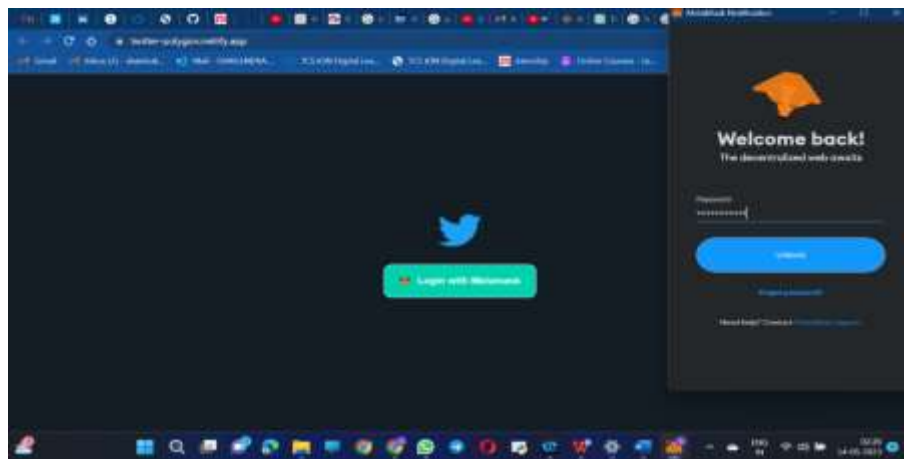


Figure 5: Login to MetaMask account to generate the gas for login in Twitter DApp

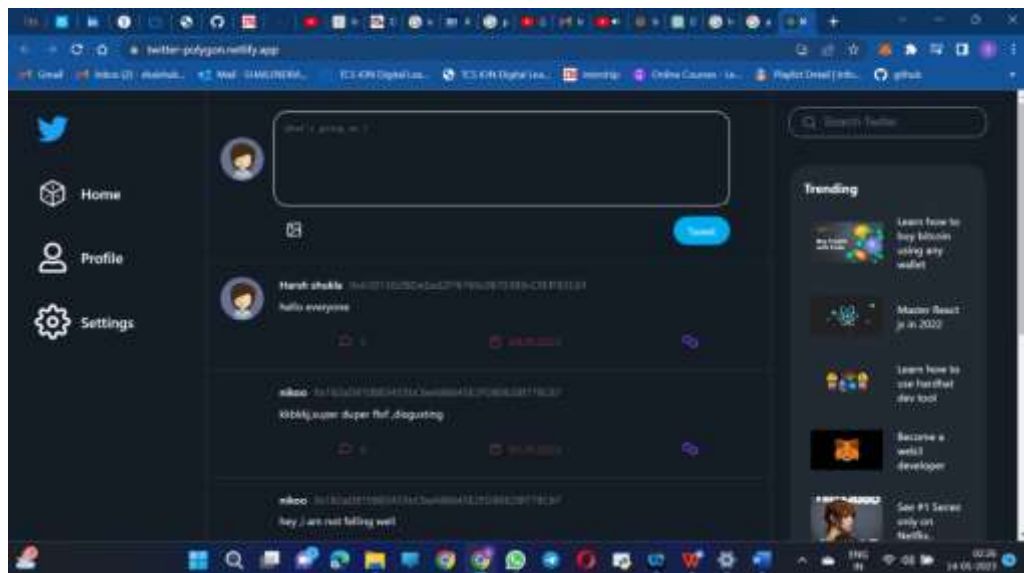


Figure 6: Login Successful

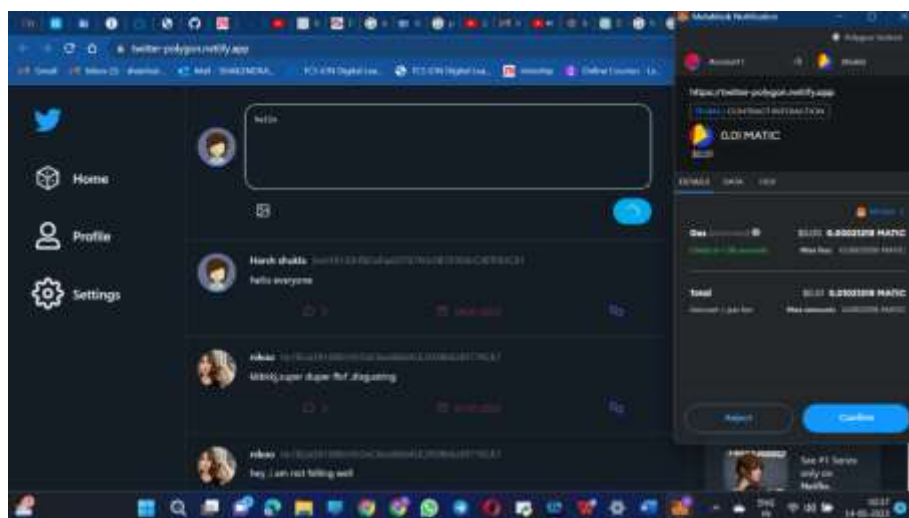


Figure 7: To perform operation in Twitter DApp get MATIC gas.

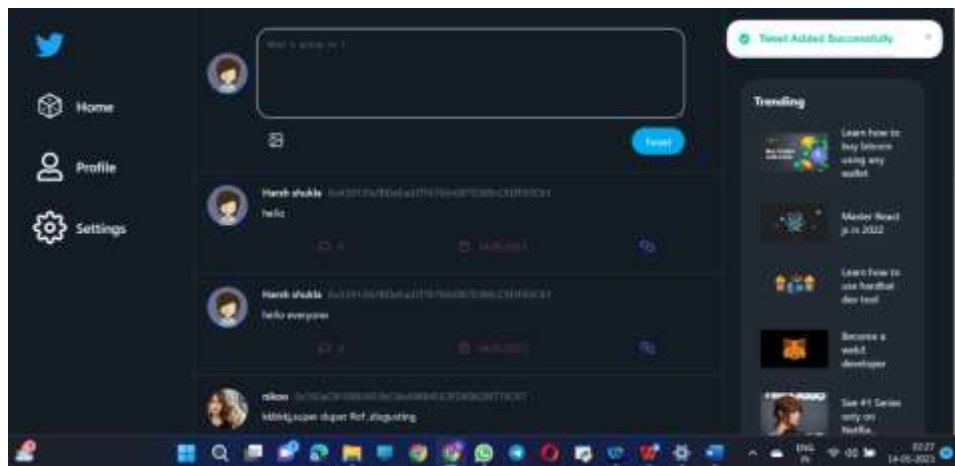


Figure 8: After gas added to MetaMask account Tweet added successfully option performed.

5. Conclusion and Future Scope

The Block Chain Based Decentralised Twitter DApp using MetaMask is an innovative solution that utilizes public blockchain, distributed ledger technology, and a decentralized system to provide a more secure, transparent, and user-controlled social media experience. By removing the need for a central authority, the platform is resistant to censorship and manipulation, providing a democratic platform for content creators to express their ideas and opinions.

The DApp leverages MetaMask browser extension, which allows users to access the Ethereum public blockchain network, and creates a secure connection between the user and the platform. The use of cryptocurrency tokens incentivizes users to participate in the platform, creating a more democratic and rewarding social media experience for all users.

The use of distributed ledger technology ensures that all user activity on the platform is transparent and secure, while the decentralized system ensures that no single entity has control over the data or user interactions. This provides users with greater control over their data and enhances their privacy and security.

Future research can explore further improvements to the user interface and experience of the DApp, as well as the scalability and performance of the platform. Additionally, further exploration of the potential impact of decentralized social media platforms on traditional social media companies and their business models can be a future direction of research.

Overall, the Block Chain Based Decentralised Twitter DApp using MetaMask demonstrates the potential of blockchain-based social media platforms to provide a more democratic, transparent, and user-controlled social media experience that empowers users and offers a solution to the growing concerns over centralized social media platforms.

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